



## **WATER RESOURCES RESEARCH GRANT PROPOSAL**

**Project ID:** 2005MS29B

**Title:** Analysis of Stream Bank Erosion by Lateral Ground Water Flow

**Project Type:** Research

**Focus Categories:** Sediments, Water Quality, Groundwater

**Keywords:** Sedimentation, Water Quality, Contaminant Transport Mechanisms, Surface Water, Ground Water

**Start Date:** 03/01/2005

**End Date:** 02/28/2006

**Federal Funds:** \$15,320

**Non-Federal Matching Funds:** \$30,700

**Congressional District:** First

**Principal Investigator:**

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University of Mississippi

**Abstract**

Sediment impairs more stream miles on the US EPA's Clean Water Act 303(d) list than any other contaminant. Researchers have focused considerable effort on understanding surface flow mechanisms of erosion. However, the role of ground water in erosion at seepage face boundaries, such as stream banks, remains unknown. The objective of this research is to investigate the erosion of stream banks by lateral ground water flow. The research objectives will be accomplished through an integrated field, laboratory, and numerical modeling procedure. Specific field tasks of this proposal include collecting soil samples at field sites undergoing subsurface bank erosion at Little Topashaw Creek (LTC) in the Yalobusha River System in Northeast Mississippi and characterizing the associated soil physical and hydraulic properties. Intermediate-scale studies will quantify the basic seepage erosion processes through a series of laboratory experiments using lysimeters, repacked with bank material to mimic the natural soil profile, subjected to subsurface flows under an array of hydraulic head and slope (water-restricting layer slope) conditions. Conceptual models of seepage erosion will be developed from the intermediate scale experiments. These conceptual models will be incorporated into a USDA-ARS National Sedimentation Laboratory model, the CONservational Channel

Evolution and Pollutant Transport System (CONCEPTS), for predicting bank failure of streams. A modified CONCEPTS model will be able to predict the importance of stream bank erosion and bank failure in contributing to the total sediment load in streams throughout Mississippi. The principal investigator, in collaboration with the USDA-ARS National Sedimentation Laboratory, has numerous years of experience in erosion research, including the past year specifically addressing this issue, and adequate resources for the research. The broader impacts of the proposed research include establishing a special mentoring program for a graduate student through the National Sedimentation Laboratory program and establishing collaborations between an academic institution (University of Mississippi) and federal government agency (USDA-ARS National Sedimentation Laboratory) which will assist in integrating this research into the broader activities of society.